

DIGITAL DATA SYSTEM
510A-TYPE DATA SERVICE UNIT
MAINTENANCE

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1. GENERAL

1.01 This section contains information concerning the maintenance of the 510A-type data service unit (DSU). The objective of this section is to coordinate the efforts of the telephone company (telco) employee at the station location with the efforts of the telco employee at the serving test center (STC) in locating and eliminating trouble involving the DSU.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 Routine maintenance is not required for the 510A-type DSU.

A. Maintenance Policy

1.04 Maintenance of a 510A DSU involves testing and/or replacing the necessary circuit packs (CPs) in the DSU nest when trouble has been isolated to the DSU by the serving test center (STC). Isolation of trouble to the DSU or DSU port(s) is accomplished from the STC by use of the CHAN and/or DSU loopback tests and, if necessary, by the maintenance procedures given in Section 314-410-310. The results of these loopback

tests will determine the course of action which should be taken to locate trouble within the DSU.

1.05 The DSU is provided with several test modes and light-emitting diode (LED) status indicators to aid in rapid troubleshooting and service restoration. The maintenance plan is designed to make use of these aids so that most troubleshooting can be done by one person working alone. The general steps to be followed are summarized as follows:

- (1) The STC receives the customer trouble report and determines the nature of the problem, then arranges proper circuit release for testing.
- (2) The STC performs loopback tests to isolate the trouble.
- (3) Network problems are handled according to established DDS routines.
- (4) DSU problems require dispatch of repair person to the station.
- (5) Repair person at station uses LEDs and station tests to guide CP replacement.
- (6) STC makes final tests to assure STC-to-STATION circuit operation.

1.06 A certain number of DSU CPs, as recommended in Table A, should be stocked as maintenance spares.

1.07 A repair person dispatched to a DSU station would not normally carry a complete replacement 510A DSU. A record of the required options as specified on the circuit layout record card (CLRC) should be carried to the DSU station. In addition, a 914C or 921A, or equivalent, data

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TABLE A

DSU CPs MAINTENANCE SPARES

CIRCUIT PACK	RECOMMENDED SPARES
KD21	1 for each 10 KD21 CP in operation
KD22	1 for each 10 KD22 CP in operation
KD23	1 for each 10 KD23 CP in operation
KD24	1 for each 10 KD24 CP in operation
KD25	1 for each 5 KD25 CP in operation
KD26	1 for each 5 KD26 CP in operation

test set (DTS) should be available for complete testing of a substrate channel.

1.08 Replacement of the entire 510A DSU nest should be required only when the power unit fails, when any one of the six electronic components of the backplane become defective or when some mechanical damage has occurred. Otherwise, the repair will be effected by replacing CPs.

2. MAINTENANCE AIDS

2.01 The following maintenance aids are provided for the performance of the maintenance procedures included in this section:

NUMBER	TITLE
SD- & CD-1D263-01	Data Systems—Digital Data System Station—510A-Type Data Service Unit
SECTION	TITLE
107-101-100	914-Type Data Test Set—Description and Operation
107-402-100	921A Data Test Set—Description and Operation
595-201-100	Digital Data System—510A-Type Data Service Unit—Description and Operation

595-201-102 Digital Data System—510A-Type Data Service Unit—Installation and Connection

595-201-104 Digital Data System—510A-Type Data Service Unit— Test Procedures

2.02 The following equipment is required for performing the tests indicated in this section:

- 914C DTS (J79914C-L1) or equivalent

or

- 921A DTS (J79921A) or equivalent.

2.03 The test procedures referred to in this section are contained in Section 595-201-104 and are as follows:

- Local test
- Functional test
- Straightaway test.

3. MAINTENANCE ACTIVITIES

3.01 When investigating a trouble report, the results of the tests performed by the STC should be used in conjunction with the trouble isolation procedures in Fig. 1 to isolate troubles in the DSU after performing the checks in 3.02.

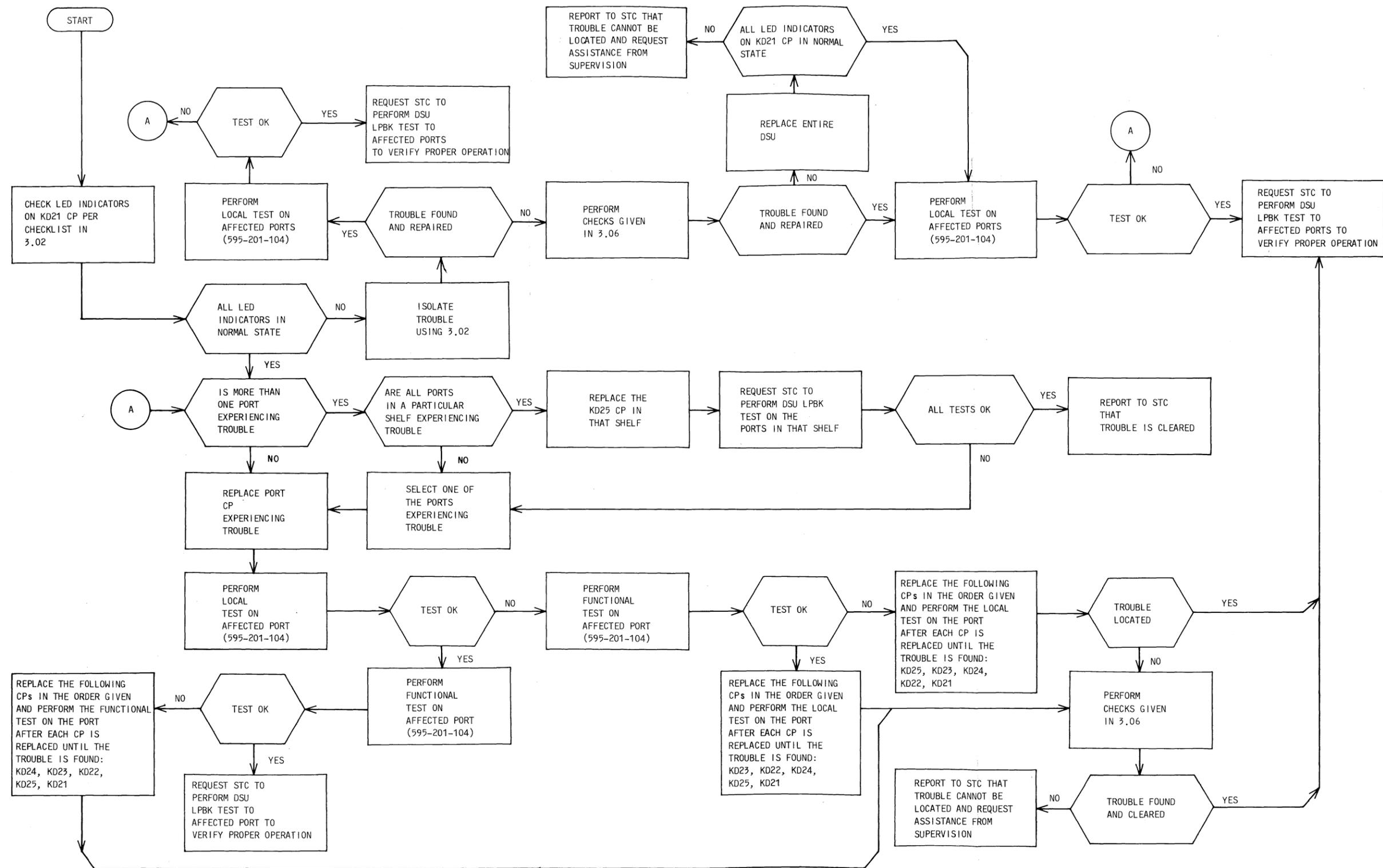


Fig. 1—Trouble Isolating Procedures for a 510A-Type DSU

3.02 Upon arrival at the station to investigate a trouble report, the repair person should first check the common circuit LEDs on the KD21 CP according to the following checklist regardless of the number of ports experiencing trouble.

(a) **POWER ON:** Should be lighted. If not, check for ac power input and verify that the circuit breaker, located behind the rear panel, is *on* (fan will run if both are alright). Check power unit voltages per Section 595-201-104. If the power unit is defective, replace the 510A DSU. If voltages are alright, replace the KD21 CP (power monitor defective).

(b) **CHANNEL NORMAL and LOOPED:** NORMAL indicator should be *on*. If the LOOPED indicator is *on*, check with the STC to see if channel (CHAN) loopback is in progress. If CHAN loopback is not in progress, request that the channel be checked for bad OCU or 56-kb/s repeater(s). If neither indicator is *on*, check for an open 4-wire loop. If both indicators are *on*, check for the presence of ac voltage on the loop (eg. power line cross to telephone wires) or for a defective KD21 CP.

(c) **NS:** Should be *off*. If it is *on* and the CHANNEL indicators are normal, the trouble is probably in the OCU or 56-kb/s repeater(s).

(d) **DOS:** Should be *off*. If it is *on*, MOS should also be *on*. Replace CPs in the following order: KD22, KD21.

(e) **MOS:** Should be *off*. If it is *on* (with DOS *off*), replace CPs in the following order: KD24, KD22, KD23, KD25 (eqpt. loc. B7), KD21. If MOS is *off* when DOS is *on*, proceed as follows:

- (1) Clear DOS per (d) above.
- (2) Remove KD25 CP from equipment location B7.
- (3) Replace CPs KD24, KD22 and/or KD21 until MOS lights.
- (4) Replace KD25 CP and verify that MOS goes *off*.

3.03 Due to the possibility of multiple-port problems not yet discovered, the above checklist should

be followed even when the initial trouble report was for a single port. Since the multiplexer and demultiplexer framing operations exercise a large portion of the common circuitry, many common circuit problems can be cleared by following this checklist.

3.04 Most single-port problems will be cleared by replacing the port CP (KD26) associated with the port in question. The built-in LL and RL (or ST) tests are used to help isolate troubles and to verify correct operation once it has been cleared. The most complete tests are made by using a DTS to verify data transmission through the looped-back channel. It is recommended that the repair person have the STC perform a DSU loopback on the repaired port before it is turned over to the customer.

3.05 Problems causing similar symptoms simultaneously on many ports should be isolated by concentrating on the common circuit packs. If groups of adjacent ports fail (eg, ports 6 through 10), the KD25 CP associated with that group (ie, in the same shelf) should first be replaced. If all ports fail, KD22 should be replaced first.

3.06 If CP replacement does not clear the trouble:

- (a) Check that the correct options are installed in the DSU.
- (b) Confirm that the business machine has been tested and checks satisfactorily.
- (c) Check for cord and connector defects.
- (d) Check for intermittent trouble in the station wiring.
- (e) Replace entire DSU.

4. MAINTENANCE PROCEDURES

4.01 Replacement of the entire DSU shall be accomplished as stated in Section 595-201-102.

4.02 Replacement of any CP in the DSU shall be accomplished as follows.

- (1) To remove a CP, hold the spring-loaded CARD RELEASE lever, associated with the

SECTION 595-201-103

shelf containing the CP to be replaced, in the released position.

- (2) Grasp the handle on the CP faceplate and pull straight out on the CP.
- (3) To install a CP, align the circuit board of the CP with the upper and lower slots in

the shelf while holding the CARD RELEASE lever operated and slide the CP into the shelf.

- (4) Press the handle on the CP faceplate until the circuit board engages the connector in the rear of the shelf then release the CARD RELEASE lever.